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Courses » Selected Topics in Decision Modeling

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Unit 5 - Week 4

Course outline

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Week 1

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Week 4

- Lecture 16 : Exhaustive Enumeration and Branch and Bound Techniques
- Lecture 17 : Branch and Bound Technique
- Lecture 18 : Assignment and Travelling Salesman Problem
- Lecture 19 : Travelling Salesman Problem (Contd.)
- Lecture 20 : Heuristic Methods for Integer Programming
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Week 4 Assignment 4

The due date for submitting this assignment has passed. **Due on 2018-09-12, 23:59 IST.**
As per our records you have not submitted this assignment.

1) Which one of the following statement is not true about Exhaustive enumeration technique for solving Integer Linear Programming problems? ***1 point***

- i. Exhaustive enumenration generates all possible integer solutions
- ii. Exhaustive enumenration evaluates all possible integer solutions
- iii. Exhaustive enumenration chooses the optimal among all possible integer solutions
- iv. Exhaustive enumenration cannot gurantee an optimal solution

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv. Exhaustive enumenration cannot gurantee an optimal solution

2) Total number of enumerations required for a 0-1 knapsack problem with 5 binary variables will be: ***1 point***

- i. 10
- ii. 16
- iii. 25
- iv. 32

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv. 32

3) Number of basic steps in the Branch and Bound algorithm are: ***1 point***

- i. 2
- ii. 3
- iii. 4

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Assignment Solution

- i. By Relaxing one or more constraints
- ii. Considering Non-negativity constraints
- iii. By Linear Programming relaxation
- iv. None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
iii. By Linear Programming relaxation

5) Value of Z for the following problem will be: ***1 point***

Maximize Z = 3x + 4y
subject to x + y ≤ 4; x and y are binary

i. 3
ii. 4
iii. 7
iv. 12

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
iii.

6) ***1 point***

Suppose we have to find a bound (Column wise) for the following Assignment proble being solved for minimization. The bound will be:

	m/c 1	m/c 2	m/c 3	m/c 4
Job A	14	8	34	14
Job B	12	10	28	32
Job C	22	18	8	26
Job D	11	24	21	21

i. 41 Infeasible
ii. 41 Feasible
iii. 43 Infeasible
iv. 43 Feasible

- i.
- ii.
- iii.
- iv.

No, the answer is incorrect.
Score: 0

Accepted Answers:
i.

7) Consider Question 6 again. Having found the bound for the total solution, we need to find the branches. Number of such branches will be: ***1 point***

- i. 2
- ii. 3
- iii. 4
- iv. 5

No, the answer is incorrect.
Score: 0

Accepted Answers:
iii. 4

8) While finding optimal solution for a Travelling Salesman problem, sub-tours are to be blocked because: ***1 point***

- i. All sub-tours cannot be found
- ii. Some sub-tours are not possible to cover
- iii. Travelling Salesman problem considers only some sub-tours, not all
- iv. Travelling Salesman problem considers only complete tours, not sub-tours

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv. Travelling Salesman problem considers only complete tours, not sub-tours

9) It is known that solution of the corresponding Assignment Problem provides a bound for a Travelling Solution Problem. Hence, the optimal solution for a Travelling Salesman Problem and the corresponding Assignment problem will be: ***1 point***

- i. Always same
- ii. Always different
- iii. Sometime same
- iv. Not related at all

No, the answer is incorrect.
Score: 0

Accepted Answers:
iii. Sometime same

10) ***1 point***

Consider a Travelling Salesman Problem with 4 cities. The distances between the cities a as given below:

	A	B	C	D
A	-	5	6	8
B	6	-	6	5
C	7	4	-	7
D	5	4	6	-

The minimum complete tour length for a Travelling Salesman problem will be:

- i. 20
- ii. 21
- iii. 22

iv. 24

No, the answer is incorrect.
Score: 0

Accepted Answers:
i. 20

11) Consider the Travelling Salesman Problem of Question 10. The optimal tour for the minimum tour length will be: ***1 point***

i. A-B-C-D-A
ii. A-C-B-D-A
iii. A-B-D-C-A
iv. A-C-D-B-A

No, the answer is incorrect.
Score: 0

Accepted Answers:
ii. A-C-B-D-A

12) Consider the Travelling Salesman Problem of Question 10. In order to solve the problem, we need to replace distance between A to A, B to B, C to C, and D to D by: ***1 point***

i. 0
ii. Lowest distance in the matrix
iii. Highest distance in the matrix
iv. A very high value M

No, the answer is incorrect.
Score: 0

Accepted Answers:
iv. A very high value M

13) While Solving a Travelling Salesman Problem of 6 cities, unique assignment obtained after some iteration is: A-D, B-C, C-E, D-B, E-F and F-A. What can you infer about the optimal solution of the Travelling Salesman Problem (TS Problem)? ***1 point***

i. The unique assignments constitute an optimal solution
ii. The unique assignments are not feasible
iii. The unique assignments are feasible but do not constitute an optimal solution
iv. None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
i. The unique assignments constitute an optimal solution

14) While Solving a Travelling Salesman Problem of 6 cities by Branch and Bound Technique, unique assignments obtained after some iteration are: A-D, B-C, C-A, D-B, E-F and F-E. What can you infer about the optimal solution of the Travelling Salesman Problem (TS Problem)? ***1 point***

i. The unique assignments constitute an optimal TS Problem solution
ii. The unique assignments constitute a TS Problem solution which is not optimal
iii. The unique assignments do not constitute a feasible TS Problem solution
iv. None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
iii. The unique assignments do not constitute a feasible TS Problem solution

15) Nearest Neighbour Heuristic is used to solve a Travelling Salesman Problem. A feasible solution to the problem is obtained. Which one of the following observations will be true? ***1 point***

- i. The solution obtained will be always optimal
- ii. The solution obtained may be optimal
- iii. The solution obtained will be never optimal
- iv. The solution obtained will be most likely optimal

No, the answer is incorrect.
Score: 0

Accepted Answers:
ii. The solution obtained may be optimal

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